

DoN Science & Technology



Future Naval Capabilities

brief to:

**Defense Acquisition University
CAPT Stephen Hancock**

Military Deputy to the Technical Director ONR

27 April 2004

Naval Science & Technology

Vision

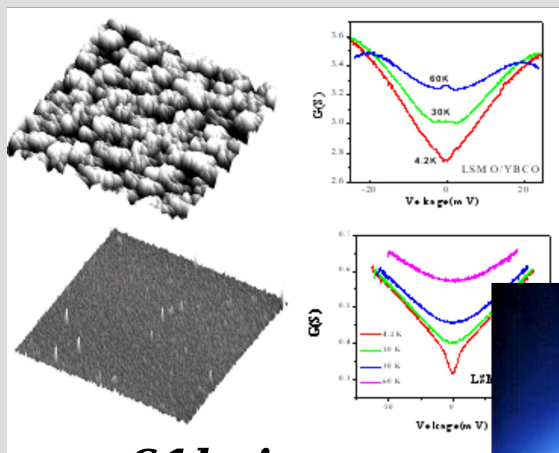


To inspire and guide innovation that will provide technology-based options for future Navy and Marine Corps capabilities...

...and to avoid technological surprise.

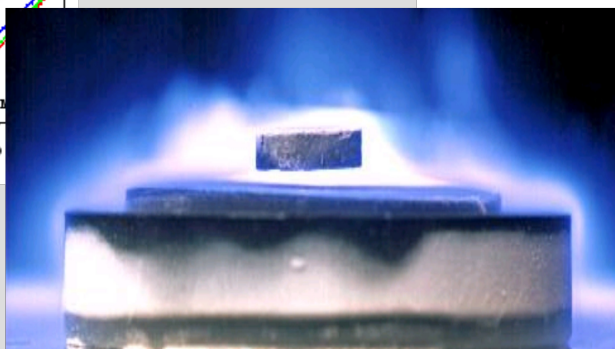
Integrated, Use-Inspired Research

- 6.1 Basic Research
- 6.2 Applied Research
- 6.3 Advanced Technology Development

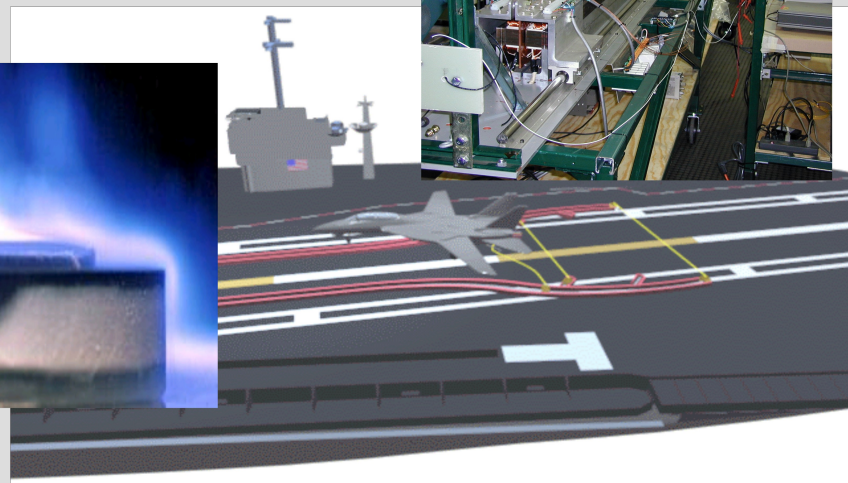
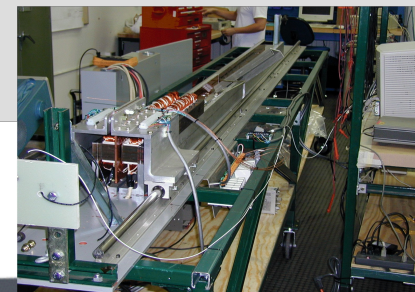


6.1 basic materials research

6.2 superconductivity technology



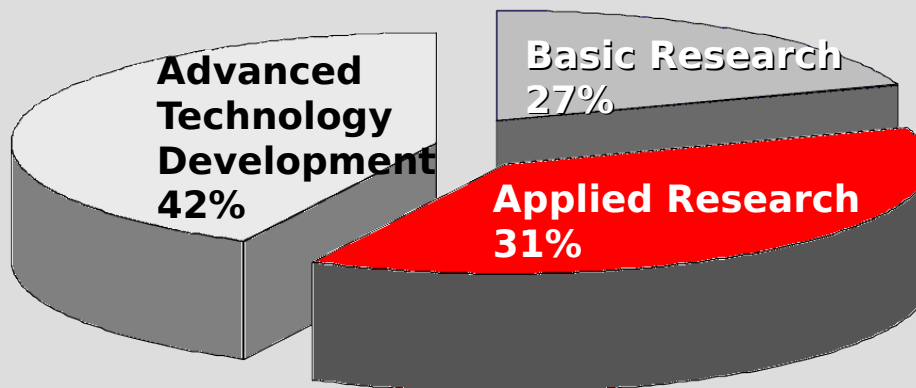
6.3 advanced electric systems



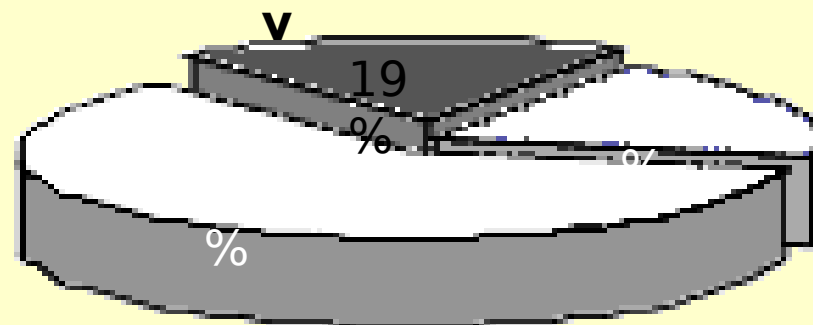
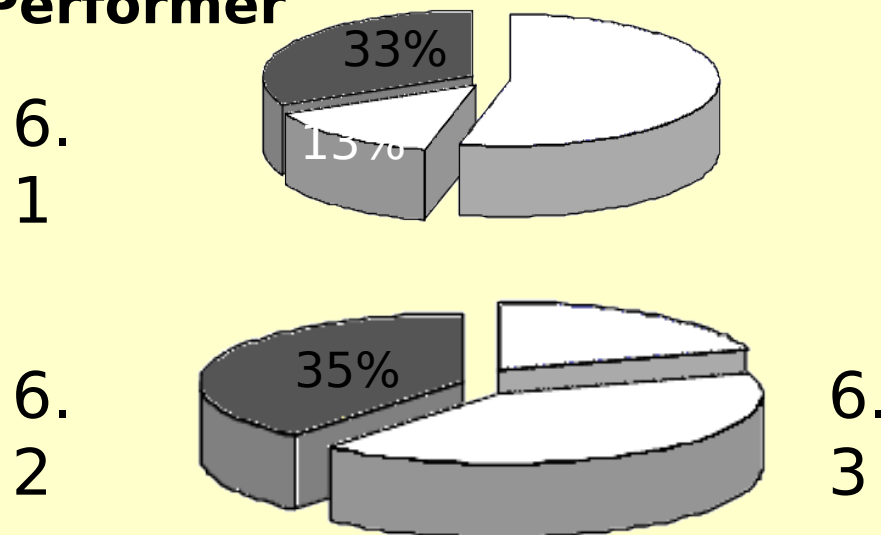
Naval FY04 S&T Budget



Investment by Research Type



Investment by Performer



S&T Investment Program

Issues



~~circa 1998~~

- Concern whether S&T delivered to the fleet
- S&T investment was “platform centric”
- SYSCOMs desired more control of the 6.3 account
- Acquisition commitment lacking for mature S&T technologies
- Continual downward trend of S&T investment
- S&T required more focus on Naval ‘capability needs’

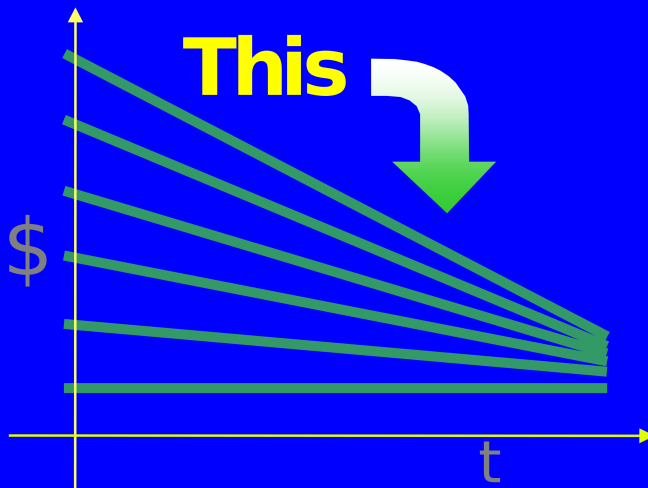
New Process was required to increase impact of S&T investment

Future Naval Capability Program



Problem

Declining total research funding for a stable number of programs reduces programs below transition critical mass



means
this...

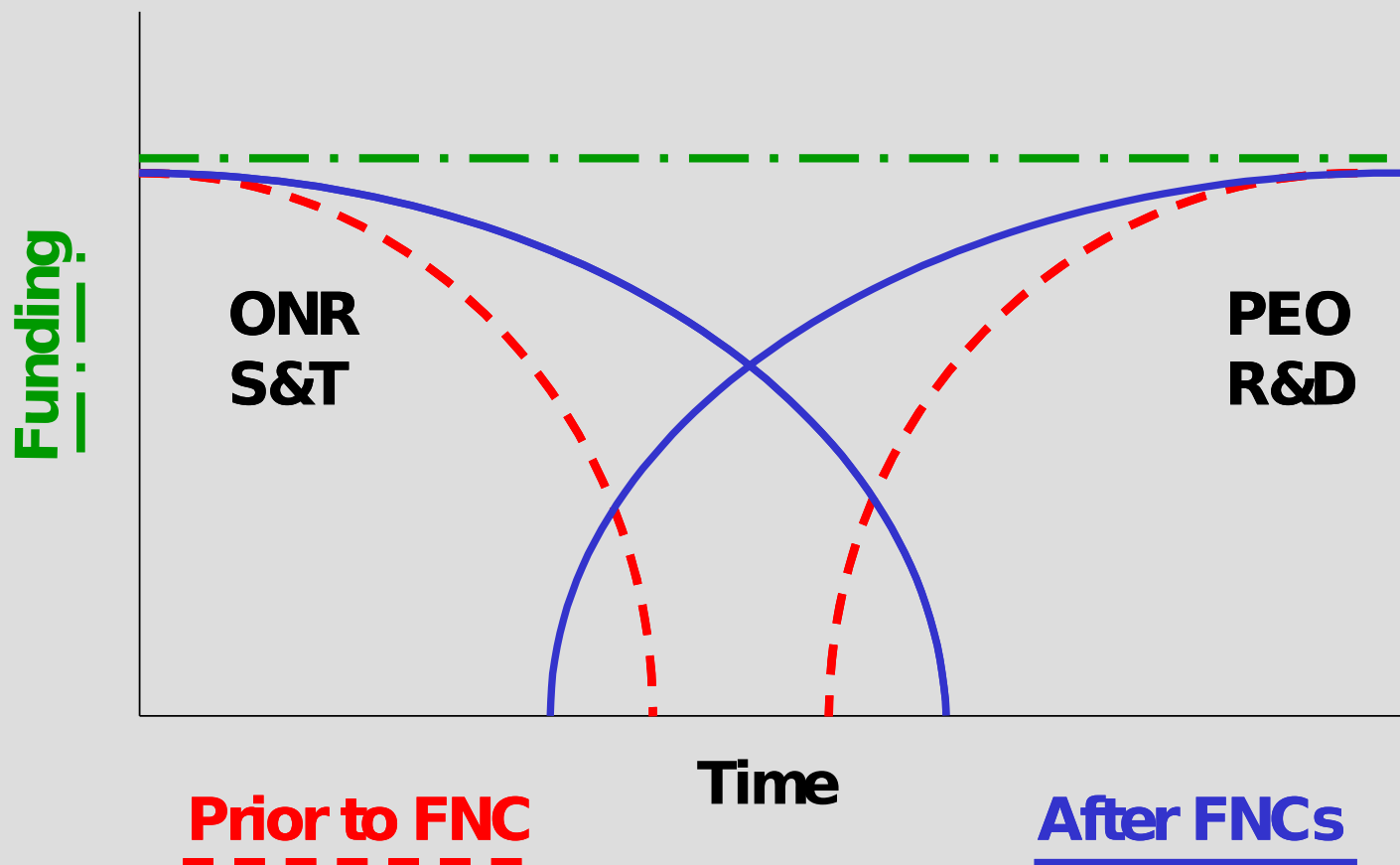
Critical Mass

But we need
this...

FNCs

Programs below critical mass were never ready for transition

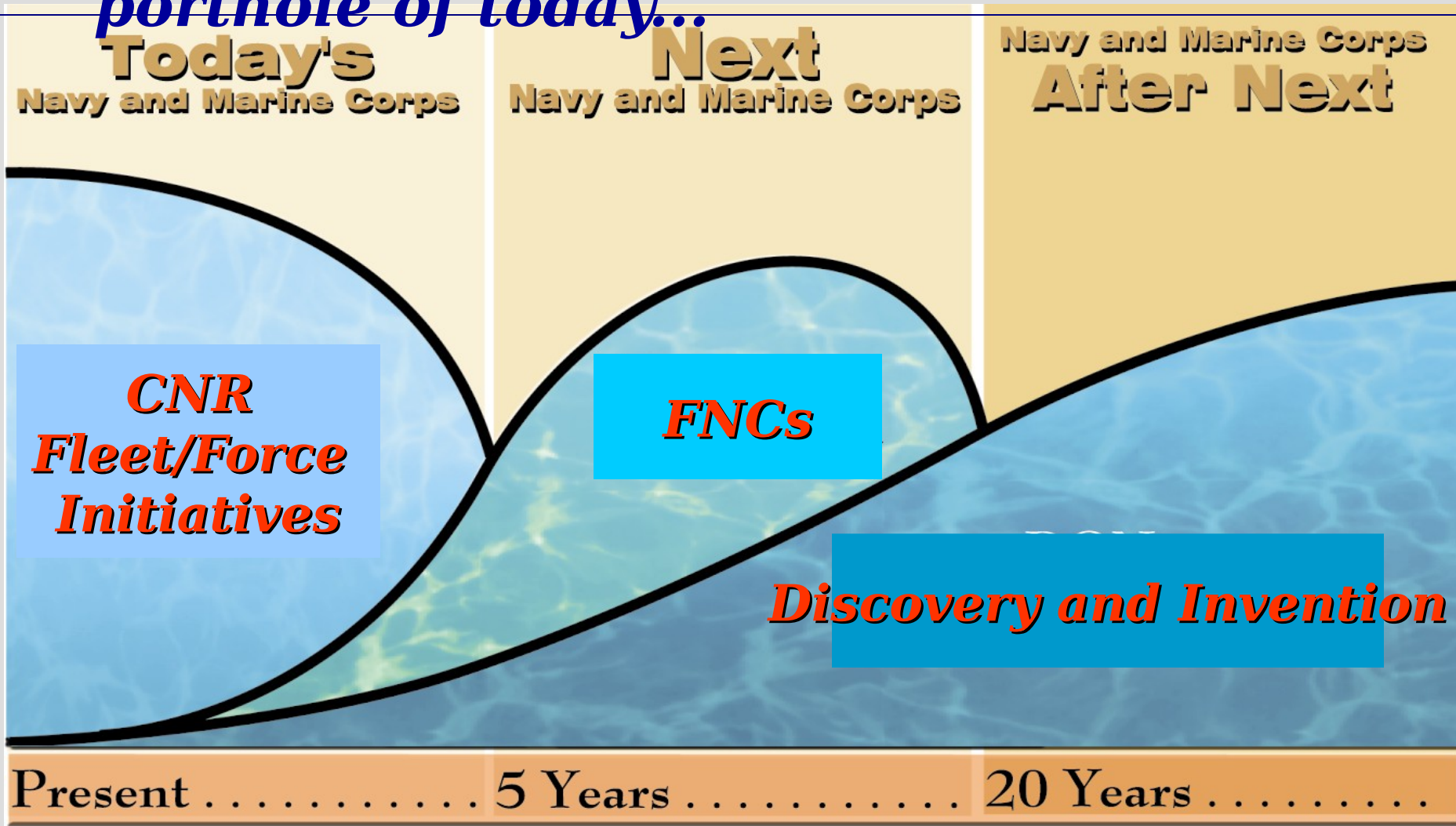
Technology “Valley of Death”



The Way Ahead for Naval S&T



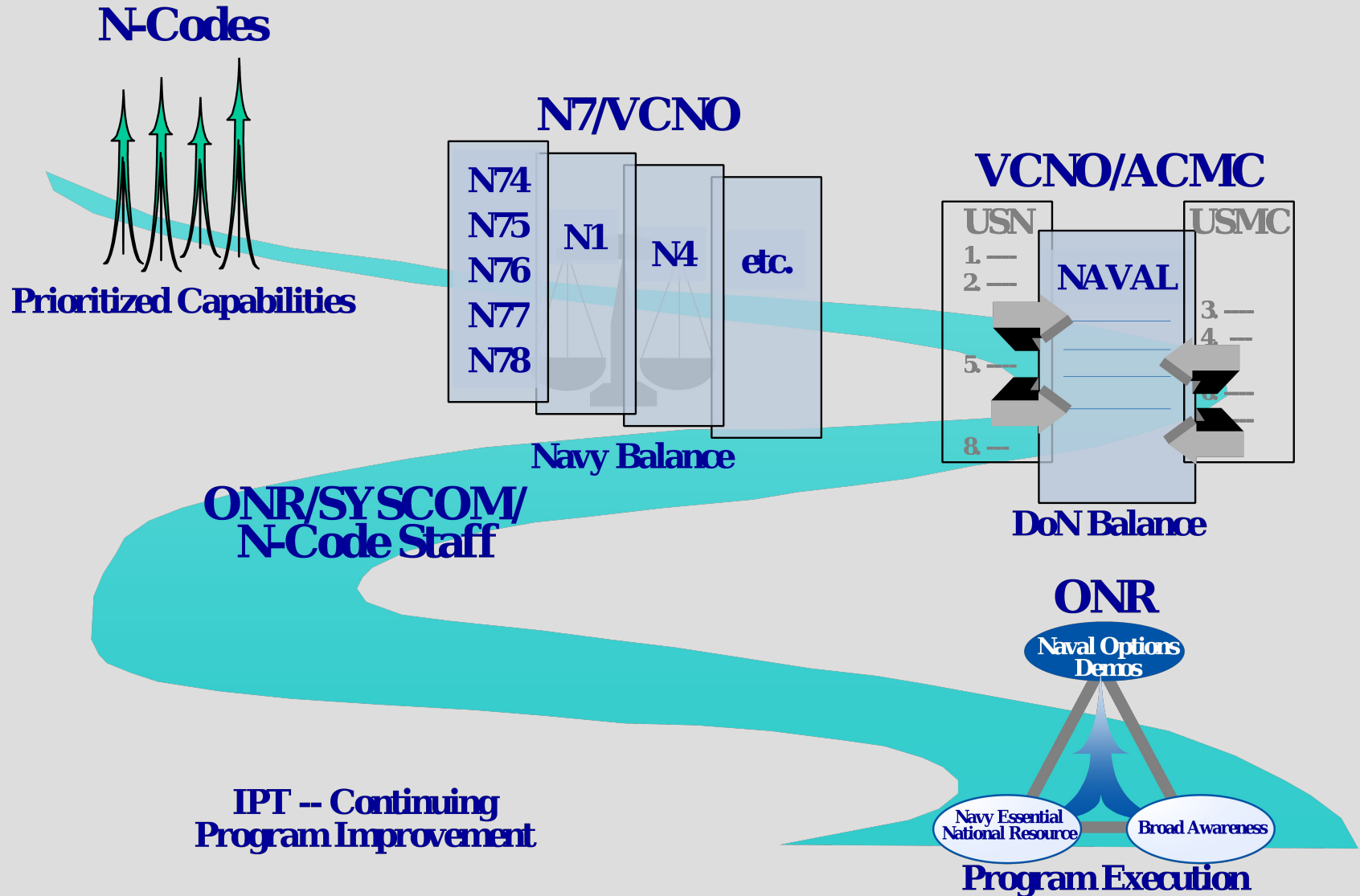
...a look at tomorrow through the porthole of today...



New Process



FNC Program Initiated (FY02)



FNC IPT Approach



IPT oversight responsibilities:

➤ Approval of the Strategy/Products that Achieve the Enabling Capabilities

- **Industry Board of Directors Model** ➤ Development & Approval of Technology Transition Agreements
- **Consensus Process** ➤ Approval of Business Plans

Key is Transition to Acquisition

FNC Composition

- **Future Naval Capability (FNC):**
 - Focuses on a high level area of technology development
 - Divided into a prioritized subset of Enabling Capabilities structured to achieve the goals of the FNC
- **FNC Enabling Capability (EC)**
 - Collection of S&T products that deliver an enabling capability upon transition
 - Focus is on delivering new technology products that enable acquisition programs to deliver new capabilities to the warfighter

EC Characteristics

- **Each FNC EC:**
 - Provides significant technology options and operating concepts for the required DON capability
 - Has a significant budget
 - Has definite milestones and objectives
 - Has concrete deliverables and a finite end-state
 - Culminates in well-defined demonstrations ***and*** product transitions to acquisition or industry

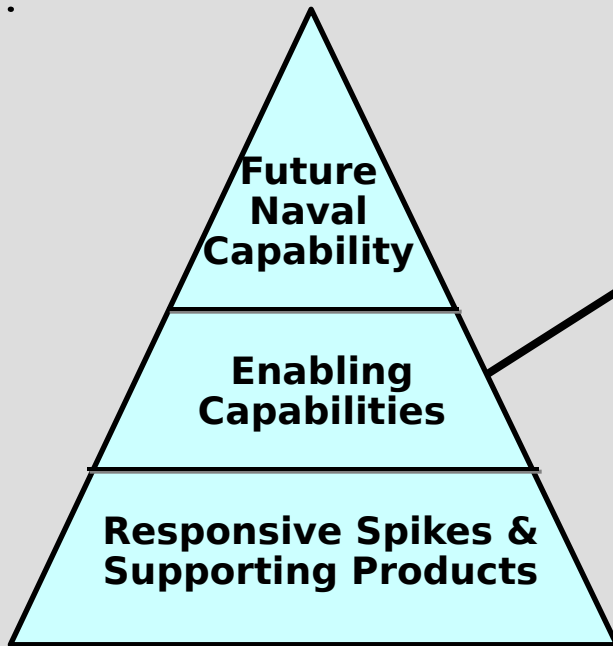
FNC Profile



Future Naval Capabilities Program Characteristics

1. Time Critical Strike
 2. Missile Defense
 3. Fleet Force Protection
 4. Littoral ASW
 5. Organic Mine Countermeasures
 6. Autonomous Operations
 7. Total Ownership Costs
 8. Knowledge Superiority & Assurance
 9. Advanced Capability Electric Systems
 10. Littoral Combat & Power Projection
 11. Environmental Protection
- **FY04 FNC Investment - \$455M**
 - **FNCs - 11**
 - **Enabling Capabilities - 37**
 - **Product Transitions over the FYDP ~ 300 (FY02-07)**

Time Critical Strike FNC



1. Defeat Expeditionary Warfare Targets with Naval Fires
2. Defeat Relocatable Targets at Range
3. Defeat Short Dwell Mobile Intermittently Emitting Targets at Range
4. Defeat Moving Targets at Range

Acquisition
RDML T. Heely
PEO(W)

Requirements
BGEM R. Neller, HQMC - Chair
ADM S. Mikemyr, IN 800 - Chair

Execution
Mr. David Masters
ONR 351

Fleet/Forces
RDML K. Donald, CPF N6/N8



5. Defeat Active Hard and
Deeply Buried Targets at
FNC
IPT

EC: Defeat Expeditionary Warfare Targets with Naval Fires



Operational Capability Gap

- Enable and maintain volume fires for Sea to Maneuver (STOM).
- Enable and maintain precision fires for urban operations where low collateral damage is a high priority.

Capability Specification / Transition Opportunities

- Man-portable, complete integrated unit, operates for 6 hours on batteries, self calibrating ~30 sec, accurate to <8 mils in azimuth.
- Double current barrel life spec with EX99 propellant charge, increase barrel length to 85 cal, extend range to 70

Deliverables, Schedule and Transitions

- | | | |
|---------|------|--|
| • ETALS | FY05 | Transition to MCSC - TLHDS |
| • AGBT | FY07 | Transition to PMS-500, Advanced Gun System |

FNC Business Approach



- **Development of a Business Plan**
 - Provides business case for S&T investment
 - Documents product-specific exit criteria
 - Contains high-level execution plan
 - Documents acquisition community's commitment to transitioned products
- **New Guidance (Jan 2004)**
 - **80% of FNC investments must be tied to product transitions requiring TTA's**
 - **20% available for innovative efforts**
 - **Exception for LASW FNC: 20% Transition**

Transition

- **S&T delivers mature product to acquisition for development and production programs**
- **Agreement on product maturity and readiness**
- **S&T Transition occurs when exit criteria is met and the acquisition program office commences integration efforts**

Technology Transition Agreement (TTA)



- **Documents the commitment between:**
 - Requirements/Resource sponsor
 - Science and Technology sponsor (developer and provider of the product or capability)
 - Acquisition sponsor (intended receiver of a product or capability)
- **Serves as contract to develop, deliver and integrate a technology/product into an acquisition program**

TTA Guidance



- **TTA Template (March 2003 Rev)**
 - Signed and dated by IPT
 - Identifies sponsors by name
 - S&T Manager
 - Resource/Requirements
 - Acquisition Program
 - Provides specific guidance on required content
- **TTA's continually reviewed/updated:**
 - Reflects changes in funding and program plans
 - Reconfirms commitment following personnel changes
- **TTA's assessed by FNC Management**

Integration Strategy

- **Outlines the process by which the FNC product is to be integrated into the acquisition program. Includes the following elements as appropriate:**
 - Evolutionary acquisition, block upgrade, etc.
 - Required contractor-to-contractor agreements
 - Acquisition PE numbers funding the transition
 - Annual PE funding levels committed to the transition program
 - Transition date -the required delivery date of the product
 - Key demonstration/test dates
 - Statement conveying the level of commitment

Exit Criteria

- **Identifies all quantifiable criteria that determines whether an FNC product is ready for transition.**
- **Negotiated exit criteria includes:**
 - A description of conditions under which technology/product will be tested/demonstrated prior to delivery to acquisition.
 - Agreement on the Technology Readiness Level (TRL) of the S&T product at transition

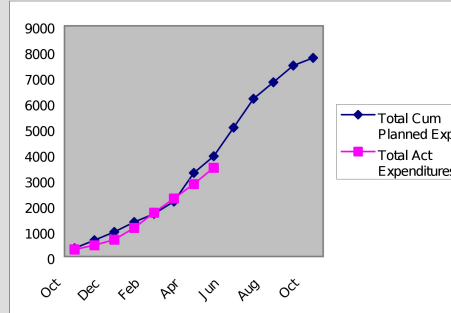
Attribute/Parameter	Current	Minimum Threshold	Objective

FNC Development Management

Cost Oversight

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Total Cum Planned Exp	320	640	959	1347	1667	2146	3266	3914	5033	6152	6801	7449	7752	7752
Total Act Expenditures	272	442	663.35	1114.65	1716.15	2266.55	2830.95	3465.75						
%	85.06%	69.11%	69.15%	82.76%	102.97%	105.60%	86.69%	88.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

	Oct	Nov	Dec	Jan	Feb	Mar	Apr
NUWC	100	165.1	262.2	518.2	652.9	789.9	963.9
APL/UW	96	129	189	262.9	373.6	462.5	536.5
APL/UW			50.7	62.2	97.8	119.4	150
Anteon	83	112.5	126	232.1	363.7	468.7	558.2
NRL	23	37.25	53.65	72.45	97.35	116.35	134.35
LMC	50	77.7	91.8	114.8	126.8	148.8	160.8
AETC	39	59.8	78.8	90	109.7	129.4	157.4
PSI	51	82	122.5	193.7	240.9	278.9	315.6
ARL/UT	0	0	0	0	0	36	72
NAWC	0	0	140	168	200	200	260
NAVO	0	0	0	1.8	3.8	10.8	17.8
NUWC	0	0	0	0	14.2	70.2	139.2
Total	442	663.35	1114.65	1716.15	2266.55	2830.95	3465.75



Failure to execute as planned identifies problems

Schedule

Failure to achieve Key Events identifies problems

Multistatics - Key Events	
October	CDMR Deployment Package Documentation
November	LWAD ADAR Data set packaged for distribution
December	Experimental System CDMR Preliminary Design Report
January	CDR for Experimental System CDMR In-Buoy Electronics

Technical

Technical issues are resolved at the lowest level. TTA Impacts (performance metrics, TRL, delivery date) are evaluated by Senior Management.

Technical Reviews

S&T Program Manager (Frequent)
 FNC Leader (Periodic)
 FNC Mgmt / Tech Director (Monthly / Problems)
 CNR (Annual / Problems)

New Environment

- **Naval Power 21**

- N6/N7 alignment (Sea Power 21/MCP process)
- Pillar IPTs (Warfare Sponsors, FNC IPTs, SYSCOMs & ONR)

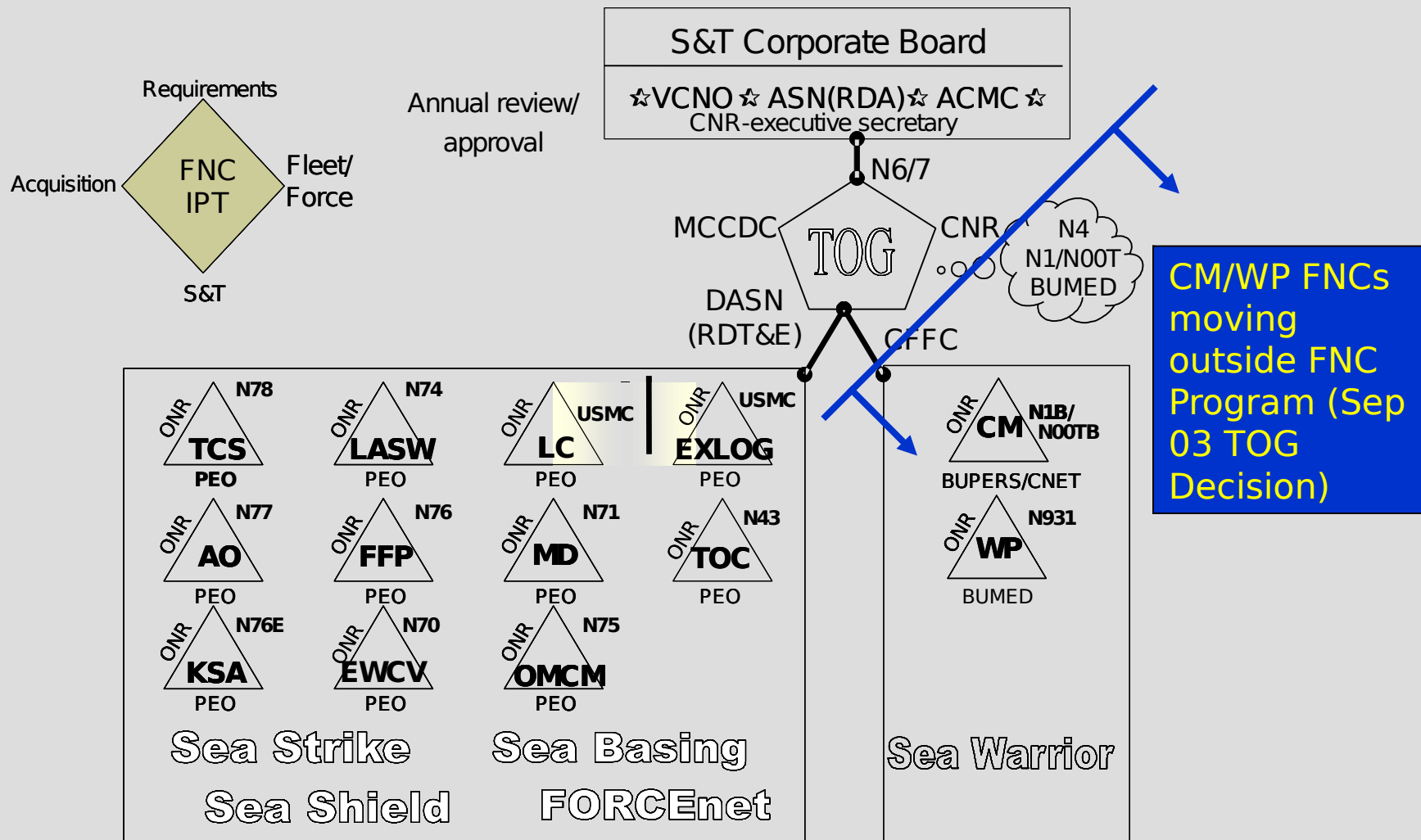
- **Sea Trial** (Pillar IPTs provide recommendations)

- **Transition/Transformation**

- 80%/20% split

**Realignment within existing ECs
and FNC/EC New Starts for FY08
and Beyond**

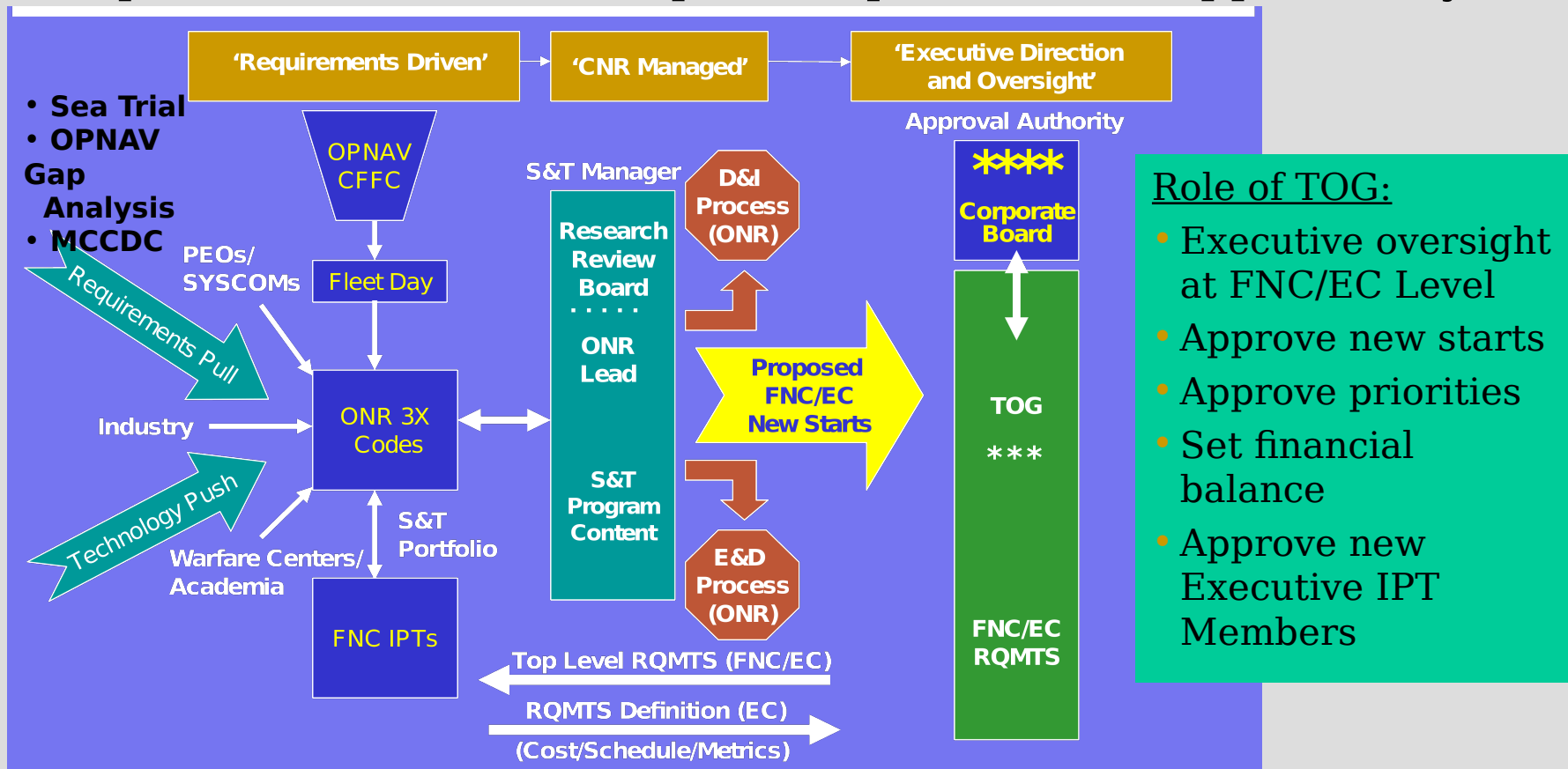
FNC Naval Power 21 Alignment



* USMC representation throughout process as appropriate

FNC New Start Process

Continuation of the FNC Process past FY07 requires promulgation of a new start process for FNCs. A requirements driven, competitive process was approved by



Future Naval Capabilities



A new way of managing S&T at ONR...

- Partners S&T with the requirements, acquisition, and fleet/force communities
 - **S&T emphasis on highest priority capabilities**
 - **S&T funding coupled to acquisition funding**
- Focuses on transition of technology products
- Management Oversight of Cost, schedule and technology development performance
- Continuously evolving program

Delivering New Capabilities to the Fleet/Force



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Provides descriptions of the Department of the Navy's Science and Technology programs and the processes of establishing and executing these programs.

[Guidance, Requirements, and Awareness](#)

Provides a reference data set for steering the S&T program investments.

[Future Naval Capabilities](#)

Provides information of interest on each of the DoN S&T Program's 12 Future Naval Capabilities.

[Discovery and Invention](#)

Describes the program for initiating investigations in areas of particular naval interest and maintaining national strength in areas that are uniquely naval in nature.

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- **Home Pages tells how to get account**

FNC Summary

- Successfully bridging the “Valley of Death”
- Focused on warfighter requirements
- Directly supports acquisition
- Aligned with Senior Leadership’s vision – Naval Power 21
- Evolving process that addresses future warfighting requirements